

IMPACT OF SENSORY EXPERIENCES ON THE ACCEPTANCE OF TROPICAL FRUIT JUICES

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SUMMARY

The introduction of new tropical fruits and their products into the market will only be successful if consumers' expectations are satisfied. Sensory characteristics, particularly taste, and health considerations play a predominant role in consumers' satisfaction and hence subsequent consumption and purchase behaviour. In this respect, we conducted exploratory research which consisted of two parts: (1) motives and barriers with regard to the purchase of tropical fruit juices were assessed through two focus group discussions ($n=15$) and (2) impact of sensory experiences on the purchase intention of three tropical fruit juices (i.e. açai juice, baobab juice and cashew apple juice) was evaluated by a descriptive survey combined with sensory testing ($n=175$). Important findings are that tropical fruit juices are consumed for their sensory sensation. Unfamiliarity with respect to taste forms a barrier to the purchase intention of tropical fruit juices. Furthermore, tasting cashew apple juice confirmed consumers' expectations whereas taste expectations were not confirmed after the consumption of açai juice and baobab juice. Repeat purchase intention and subsequent consumption are determined more strongly by confirmation of taste expectations, rather than by perceived health and nutritional benefits and search attributes such as 'attractiveness'.

INTRODUCTION

In Europe, consumers' demand for tropical fruit products is expanding due to increased health consciousness, population growth of ethnic minorities in Europe and through international travel and global communication (FAO, 2003; Centeno, 2005). The food industry is also making greater use of tropical fruits as ingredients for a wide assortment of food products in order to respond to consumers' growing interest in innovative products with new and exotic flavours and tastes (Kortbech-Olesen, 1996). Nonetheless, numerous processed tropical fruit products are quite unknown to many consumers. In order to achieve product acceptance followed by successful market introduction, it is of prime importance to gain insight in the factors determining consumers' food choice and consumption behaviour.

Numerous studies mention sensory characteristics - particularly taste -, followed by health considerations, as prominent motivations for fruit consumption and subsequent purchase intention (Verbeke *et al.*, 2006; Enneking *et al.*, 2007; Poole *et al.*, 2007). Tuorila and Cardello (2002) assessed consumer responses to an off-flavour in fruit juices and revealed that consumption may not be repeated if the first impression of taste is poor. Also Deliza *et al.* (2003) cited that foods are unlikely to be accepted if consumers do not like the flavour. Apart from sensory and health properties, consumers also rely on various product attributes, such as product image, brand, packaging, price and convenience, which are traded-off against each other during their decision-making

process (Brunso *et al.*, 2002; Enneking *et al.*, 2007). Deliza *et al.* (2003) found that, besides taste and nutritional information, also convenience and cost are important factors influencing the purchase intention of pineapple juice. Furthermore, individual socio-demographic characteristics (e.g. gender, age, social class and place of living) and situational factors (e.g. time and place of purchase) influence consumers' food choice behaviour (Kamphuis *et al.*, 2006).

The complex interaction between different factors influencing consumers' decisions to eat fruit and their products has been widely described in literature. Little research has been done on this topic with respect to tropical fruit products, though. Nonetheless, when launching tropical fruit products it is important to understand how consumers perceive these products and how they build up purchasing and consumption intentions.

This paper presents results that are part of broader research which investigates the different factors influencing the purchase of new and relatively unknown tropical fruits and their products (Sabbe *et al.*, 2007a). The present study focuses on tropical fruit juices and its objective is twofold. Firstly, it explores consumers' motivations and barriers to purchase tropical fruit juices and secondly, it assesses the impact of sensory experiences on the purchase intention and hence product acceptance of three tropical fruit juices.

MATERIALS AND METHODS

In order to gain insight in consumers' motivations and barriers towards the purchase of tropical fruit juices, two focus group discussions ($n=15$) were carried out in Ghent (Belgium) (Sabbe *et al.*, 2007b). A first group consisted of seven women aged between 25 and 40 years, whereas the second group included eight women between 50 and 65 years. All respondents were open-minded to tropical fruits, had some knowledge about this fruit category and were consumers of tropical fruit juices.

Prior to the focus group discussions, a guide was developed. The guide consisted of instructions for the discussion procedure and described the topics that had to be discussed. A professional research agency assisted in conducting the focus group discussions: they recruited the participants and facilitated the group discussions. The sessions were videotaped - with participants' permission - and transcribed. A qualitative analysis of the transcripts was subsequently performed.

To assess the impact of sensory experiences on the acceptance of tropical fruit juices, a questionnaire, combined with sensory tests was used (Sabbe *et al.*, 2007c). Before tasting, consumers' general expectations about processed tropical fruit products and their purchase intention were measured by evaluating the multiple product attributes 'good quality', 'special', 'attractive', 'good

taste', 'nutritious', 'safe' and 'health'. After tasting, the same attributes were used to evaluate the tested product, and the subsequent purchase intention was again assessed. In this way, acceptance of the tropical fruit juice could be determined by the match or mismatch between expectations before and experiences after tasting.

The questionnaire and sensory tests were carried out during an exhibition (Agriflanders) in Ghent (Belgium). Respondents were selected by convenience and by their willingness to participate. In total, 175 questionnaires integrating sensory tests of three tropical fruit juices i.e. açai juice ($n=60$), baobab juice ($n=56$) and cashew apple juice ($n=59$) were analysed by means of SPSS12.0.

RESULTS AND DISCUSSIONS

The focus group discussions revealed that pleasure-seeking or hedonism appears to be a major stimulus for the purchase of tropical fruit juices. In fact, the most important purchasing motivations are consumers' need for indulgence, the festive character of the juices and their perceived special taste. Different exotic fruit combinations and their convenience in usage and consumption also form important drivers for the purchase and subsequent consumption of tropical fruit juices. In line with consumers' growing demand and search for natural and healthy products (von der Linden, 2004), it was not surprising to find that freshly squeezed tropical fruit juices are preferred to concentrates and nectars. Their naturalness, perceived healthiness and convenience in use are convincing factors for purchasing these fruit juices.

On the other hand, unfamiliarity with the tropical fruits processed in the juices mainly influences consumers' purchase decision. Most respondents buy tropical fruits containing a mixture of known and unknown (tropical) fruits but tend to reject juices containing mainly unknown tropical fruits. Lack of knowledge with respect to taste combined with high price are mentioned to form the main barriers to purchase tropical fruit juices.

In a second study, the impact of sensory experiences on the acceptance of tropical fruit juices and repeat purchase intention was measured by evaluating multiple product attributes before and after tasting açai juice (Figure 1), baobab juice (Figure 2) and cashew apple juice (Figure 3), respectively.

Consumers' general expectations are confirmed after tasting cashew apple juice (Figure 3). However, this expectation confirmation is not reflected in a subsequent purchase intention. With respect to açai juice and baobab juice, consumers' general expectations before tasting are not confirmed after tasting the juices (Figure 1 and Figure 2, respectively). After tasting these tropical fruit juices, the attributes 'good taste', 'attractive', 'healthy' and 'nutritious' received lower scores. Unfamiliarity with new and exotic flavours seems to lead to expectation disconfirmation with respect to the attribute 'taste' as respondents could not refer to already known and established flavours and tastes. Together with the disconfirmation of taste expectation, a simultaneous decrease in the rating of some other non-sensory attributes is observed. The respondents considered açai juice and baobab juice after their consumption less 'attractive', less 'nutritious' and less 'healthy'. Furthermore, expectation disconfirmation with respect to the attribute 'taste' is also reflected in a lower rating of the purchase intention. Apparently, consumers deduce other (non-sensory) quality attribute expectations from sensory experiences.

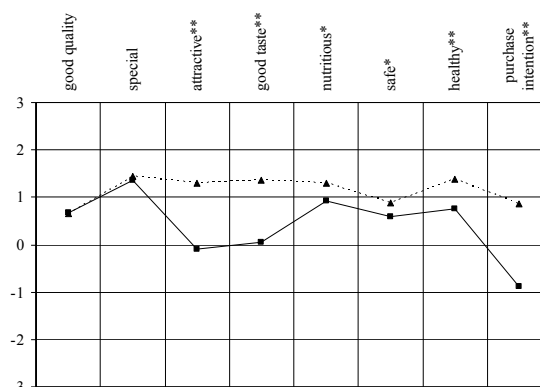


Figure 1 Evaluation of product attributes before and after tasting açai juice
(Legend: -▲- = before tasting; —■= after tasting;
** $p < 0.01$; * $p < 0.05$)

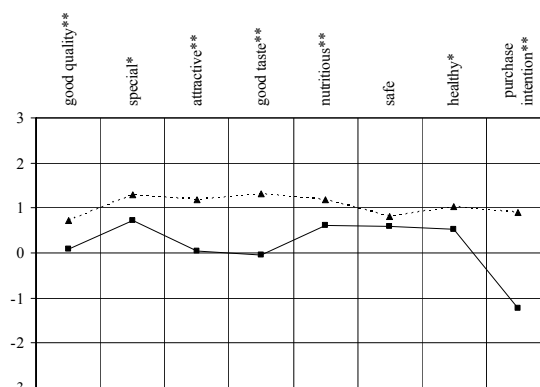


Figure 2 Evaluation of product attributes before and after tasting baobab juice
(Legend: -▲- = before tasting; —■= after tasting;
** $p < 0.01$; * $p < 0.05$)

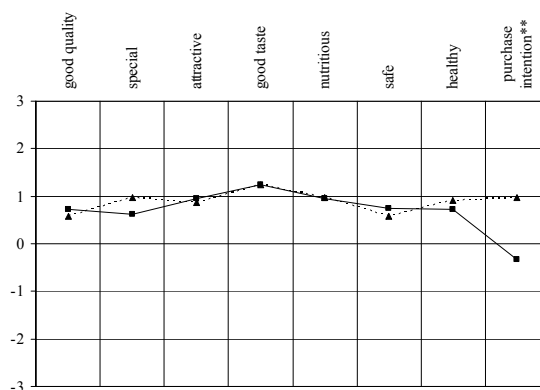


Figure 3 Evaluation of product attributes before and after tasting cashew apple juice
(Legend: -▲- = before tasting; —■= after tasting;
** $p < 0.01$; * $p < 0.05$)

Sensory experience is shown to greatly influence the acceptance of tropical fruit juices, but also seems to affect consumers' perceptions about health and nutritional benefits. Although the tested tropical fruit juices have outstanding nutritional values (PAVUC, 2007), a decrease in beliefs about their health and nutritional benefits is observed when disconfirmation of taste expectation occurs. Subsequent purchase intention and hence consumption is thus dominated by taste confirmation, rather than by perceived health and nutritional benefits. These findings are in line with several studies evaluating the trade-off between taste and health considerations by product acceptance (Tuorila and Cardello, 2002; Luckow and Delahunty, 2004; Verbeke, 2006). However, disconfirmation of expectation with respect to the attribute 'taste' can not completely explain the observed decrease in the purchase intention of cashew apple juice (Figure 3). Apart from taste and the evaluated attributes, numerous other variables seem to influence consumers' satisfaction and subsequent purchase intention. This is in accordance with several studies (Pollard *et al.*, 2002; Baker and Wardle, 2003) which stated that besides taste and health concerns, also cost, perceived availability and convenience are to be considered as important purchasing determinants.

CONCLUSION

Respondents consume tropical fruit juices for the sensory sensation. However, unfamiliarity with respect to taste forms a barrier to purchase tropical fruit juices. In summary, sensory experiences play a predominant role in consumers' satisfaction and hence the acceptance of tropical fruit juices. Repeat purchase intention and consumption is determined more strongly by confirmation of taste expectations, rather than by perceived health and nutritional benefits and search attributes such as 'attractiveness'.

Interesting as the results might be, this research has some limitations. The main limitations are linked to the used research method and more specifically, their qualitative nature. A first limitation results from the selection of respondents. Therefore, findings are preliminary and can neither be extrapolated to the overall Belgian population, nor to populations in other European countries. A second limitation is that no specific elicitation techniques in an exploratory research phase were applied. As a result, important attributes determining consumers' expectations about tropical fruit juices may have been neglected in this study.

Despite the aforementioned limitations, the present study reveals some important issues dealing with the relationship between taste and product acceptance. The food industry must thus manage to respond with good-tasting products in order to achieve successful market integration of tropical fruit juices. This conclusion encloses important challenges for food product designers, food technologists and sensory scientists dealing with tropical fruit products that are expected to boom in the next couple of years.

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REFERENCES

Baker, A.H. and Wardle, J. (2003) Sex differences in fruit and vegetable intake in older adults. *Appetite* 40, p. 269-275.

Brunso, K., Fjord, T.A. and Grunert, K.G. (2002) Consumers' food choice and quality perception. MAPP, No. 77: working paper. Aarhus School of Business, Aarhus, Denmark, p. 60

Centeno, G. (2005) *El Mercado de las frutas tropicales exóticas en la Unión Europea*. CIMS, Costa Rica, p. 39.

Deliza, R., Rosenthal, A. and Silva, A.L.S. (2003) Consumer attitude towards information on non conventional technology. *Trends in Food Science and Technology* 14, p. 43-49.

Enneking, U., Neumann, C. and Henneberg, S. (2007) How important intrinsic and extrinsic product attributes affect purchase decision. *Food Quality and Preference* 18(1), p. 133-138.

FAO (2003) Tropical fruits – their nutrient values, biodiversity and contribution to health and nutrition. Intergovernmental group on bananas and on tropical fruits, third session, ftp.fao.org/unfao/bodies/ccp/ba-tf/04/j0715e.pdf (accessed 27 April 2007)

Kamphuis, C.B.M., Giskes, K., de Bruijn, G.J., Wendel-Vos, W., Brug, J. and van Lenthe, F.J. (2006) Environmental determinants of fruit and vegetable consumption among adults: A systematic review. *British Journal of Nutrition* 96(4), p. 620-635.

Kortbech-Olesen, R. (1996) Tropical fruit products: A well established market. *International Trade Forum* 3, p. 10-18.

Luckow, T. and Delahunty, C. (2004) Which juice is 'healthier'? A consumer study of probiotic non-dairy juice drinks. *Food Quality and Preference* 15(7-8), p. 751-759.

PAVUC (2007) Bibliographic review on chemical and biochemical composition of fruits. Technical report. PAVUC, Costa Rica, p. 50.

Pollard, J., Kirk, S.F.L. and Cade, J.E. (2002) Factors affecting food choice in relation to fruit and vegetable intake: A review. *Nutrition Research Reviews* 15, p. 373-387.

Poole, N.D., Martínez, L.M.-C. and Jiménez, F.V. (2007) Quality perceptions under evolving information conditions: Implications for diet, health and consumer satisfaction. *Food Policy* 32, p. 175-188.

Sabbe, S., Verbeke, W. and Van Damme, P. (2007a) Factors influencing the purchase of fresh and processed tropical fruit products: Exploratory research findings from Belgium. Paper presented at the 5th International Symposium on new crops and uses: their role in a rapidly changing world. CUC, Southampton, United Kingdom, p.24.

Sabbe, S., Verbeke, W. and Van Damme, P. (2007b) Confirmation/disconfirmation of consumers' expectations about fresh and processed tropical fruits. Working paper. Ghent University, Department of Plant Production, Ghent, Belgium, p. 37

Sabbe, S., Verbeke, W. and Van Damme, P. (2007c) Motives and barriers for tropical fruit consumption in Belgium: Exploratory findings. Working paper. Ghent University, Department of Plant Production, Ghent, Belgium, p.26.

Tuorila, H. and Cardello, A.V. (2002) Consumer responses to an off-flavor in juice in the presence of specific health claims. *Food Quality and Preference* 13, p. 561-569.

Verbeke, W. (2006) Functional foods: consumer willingness to compromise on taste for health? *Food Quality and Preference* 17(1-2), p. 126-131.

von der Linden, U.M. (2004) Tropical Europeans. In: Murray, N. (ed.) *Foodnews Europe*, Agra Informa Ltd., United Kingdom, p. 4-10.